FAX COVER SHEET

Date: 6-02-06

To: Shay L. Balsis FAX: (571) 273-8300

From: Michael A. McGraw FAX: (206) 350-3129

Re: Application No. 10/708,506

Number of pages including Cover: 12

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June 1, 2006

To: Shay L. Balsis — by FAX: 571-273-8300
Examiner - USPTO — Phone: 571-272-1268

From: Michael A. McGraw Phone: (281) 652-6313
Applicant

Re: Application No. 10/708,506
Art Unit 1744

Dear Ms. Balsis:

I will try my best to respond with the proper procedure to the attached Office Action Summary. Please advise me if I need to use different language or format. With regards to the restriction requirements I received from you on May 15, 2006, I am responding as follows:

Figure 1: Withdrawn
Figure 1a: Elect to keep original
Figure 2: Withdrawn
Figure 3: Withdrawn
Figure 4: Withdrawn
Figure 5: Withdrawn
Figure 6: Withdrawn
Figure 7: Elect to keep original
Figure 8: Elect to keep original
Figure 9: Elect to keep original
Figure 10: Elect to keep original
Figure 11: Elect to keep original
Figure 12: Elect to keep original
Figure 13: Elect to keep original
Figure 14: Elect to keep original
Figure 15: Withdrawn
Figure 16: Withdrawn
Figure 17: Withdrawn
Figure 18: Withdrawn
Figure 19: Withdrawn
Figure 20: Withdrawn
Figure 21: Withdrawn
Figure 22: Elect to keep original

I will list the original claims and indicate which are withdrawn and which I elect to keep. I have noted that in order to keep the spirit of the distinct species I will have to make additions to one of the original claims. These additions are moved from the old original claim #13. I will note this by placing (addition-moved from original #13) in front of it. Please note that the underwater vacuum and sterilization invention I am making claims for is one that utilizes water suction, a rotable brush, is self-propelled, and injects a sterilization chemical. The internal containment chamber concept will be withdrawn as well as the handheld embodiments.

Claims:

1. (Original Keep) An underwater system for cleaning and chemically sterilizing interior surfaces of drinking water storage, treatment, or distribution facilities comprising:

(Withdrawn) a vacuum housing having a suction opening at the bottom thereof and a vacuum housing outlet opening, and said vacuum housing having an exterior and an interior;

(Added-moved from original #13) a vacuum housing having a suction opening at the bottom thereof and a vacuum housing outlet opening, said suction opening being substantially rectangular and having a rear edge, a right edge, a left edge, and a front edge, said suction opening having a perimeter and said perimeter of said suction opening defining a plane, said vacuum housing having an exterior and an interior, said vacuum housing having a base portion and a cap portion, said cap portion having a rear wall and a front wall spaced apart from said rear wall, said cap portion having a closed top and an open bottom, said open bottom being smaller in area than said suction opening, said cap portion being joined to said base portion at said open bottom of said cap portion, said cap portion having lateral walls that extend between said front and rear wall, said cap portion having a decreasing cross sectional area in sections parallel to said plane of said suction opening, said cross sectional area of said cap portion decreasing from a maximum where said cap portion joins said base portion to a minimum at said closed top of said cap portion;

(Added-moved from original #13) said base portion having a curved front wall extending from said front edge of said suction opening to said front wall of said cap portion, a rear wall extending perpendicular to said plane of said suction opening from said suction opening rear edge to said rear wall of said cap portion, a right sidewall extending from said curved front wall of said base portion to said rear wall of said base portion and from said right edge of said suction opening to said cap portion, and a left sidewall extending from said curved front wall of said base portion to said rear wall of said base portion and from said left edge of said suction opening to said cap portion, said front and rear walls of said base portion, said left sidewall, said right sidewall, and said cap portion cooperatively forming a concavity which opens to said suction opening;

(Added-moved from original #13) said vacuum housing outlet opening being formed in said front wall of said cap portion, said vacuum housing outlet opening being as wide as said closed top of said cap portion and extending from said closed top of said cap portion to said curved front wall of said base portion;

(Original Keep) a variable-pressure-fluid mechanism fixed to the interior of said vacuum housing for providing a variable-pressure fluid flow against the surface to be cleaned and sterilized, said variable-pressure fluid mechanism being in communication with an exterior fluid supply line

extending through the vacuum housing and connected to a fluid pump at the water surface,

(Original Keep) a sterilization chemical and fluid source above the water fluidly connected to said variable pressure pump at the water surface,

(Withdrawn) an interior containment chamber adjustably fixed to the interior of said vacuum housing with four walls parallel to each wall of said vacuum housing having an opening on the top and bottom and having more than one flexible member, seal or plurality of bristles or brushes thereby defining a circumferential seal on the bottom edges of said four walls which is fluidly connected to both the interior cavity and the interior of the housing for containing said variable-pressure fluid flow from entering water on the exterior of said vacuum housing,

(Original Keep) a turbine housing fixed to said exterior of said vacuum housing, said turbine housing having a turbine housing inlet and a turbine housing outlet, said turbine housing inlet being in fluid communication with said vacuum housing outlet opening;

(Original Keep) a turbine rotatably supported within said turbine housing;

(Original Keep) an outlet pipe supported by said vacuum housing, said outlet pipe having an outlet pipe inlet and an outlet pipe outlet, said outlet pipe inlet being in fluid communication with said turbine housing outlet;

(Original Keep) a pair of front wheels rotatably supported by said vacuum housing proximate said suction opening, said plurality of wheels supporting said suction opening adjacent a surface to be cleaned, and allowing the underwater vacuum to be moved about the surface to be cleaned;

(Original Keep) a pair of rear wheels and axel rotatably supported within said vacuum housing;

(Original Keep) a means for transmitting rotational motion to said plurality of rear wheels from said turbine, whereby the underwater vacuum is self-propelled over the surface being cleaned;

(Added-moved from original #13) a brush rotatably supported within said vacuum housing, said brush having a plurality of bristles, said brush being positioned within said vacuum housing such that a predetermined number of said plurality of bristles project beyond said suction opening to the outside of said vacuum housing and contact the surface to be cleaned;

(Added-moved from original #13) means for transmitting rotational motion from said turbine to said brush;

(Added-moved from original #13) a variable pressure fluid mechanism fluidly connected to variable pressure pump at water surface for transmitting chemical sterilization chemical and fluid to the interior of the vacuum housing to sterilize and additionally clean surface;

(Added-moved from original #13) whereby, when said underwater vacuum is supported adjacent a submerged surface to be cleaned by said plurality of wheels and when said outlet pipe outlet is connected to a pump via a hose and the pump is turned on, water being drawn through said vacuum housing will cause rotation of said turbine which in turn causes rotation of said brush to thereby dislodge matter from the submerged surface, the dislodged matter becoming entrained in water being drawn through said vacuum housing, the water and the dislodged matter being removed from proximity of the submerged surface via the outlet pipe.

(Original Keep) whereby, when said underwater vacuum and sterilization system is supported adjacent a submerged surface to be cleaned by said plurality of wheels and when said outlet pipe outlet is connected to a pump via a hose and the pump is turned on, water being drawn through said vacuum housing will cause rotation of said turbine, which in turn causes rotation of said rear wheels;

(Original Keep) whereby, when said variable pressure fluid pump is turned on said variable pressure fluid jets cause variable pressure fluid and sterilization chemical flow against said submerged surface to thereby dislodge matter from and sterilize the submerged surface, the water, fluid and chemical and the dislodged matter becoming entrained in water being drawn through said vacuum housing, the water and the dislodged matter being removed from proximity of the submerged surface via said outlet pipe.

2. (Original Keep) The underwater vacuum and sterilization system according to claim 1, wherein said suction opening has a rear edge, a right edge, a left edge, and a front edge, and wherein said plurality of wheels includes a plurality of rear wheels and a plurality of front wheels, said plurality of front wheels being rotatably supported on said exterior (changed from interior) of said vacuum housing proximate said front edge, and said plurality of rear wheels rotatably supported on said interior of said vacuum housing and being connected by a connecting shaft or axel proximate said rear edge.

3. (Original Keep) The underwater vacuum and sterilization system according to claim 2, further comprising means for transmitting rotational motion to said plurality of rear wheels from said turbine, whereby the underwater vacuum is self-propelled over the surface being cleaned.

4. (Original Keep) The underwater vacuum and sterilization system according to claim 2, wherein:

(Original Keep) said suction opening has a perimeter and said perimeter of said suction opening defines a plane, wherein each of said plurality of front wheels is attached to said vacuum housing by a respective one of a first plurality of adjustable attachment means such that the position of each of said plurality of front wheels can be adjusted in a direction approximately perpendicular to said plane of said suction opening; and

(Original Keep) wherein said plurality of rear wheels are coaxially fixed to a common shaft rotatably supported by said vacuum housing, there further being a second pair of adjustable attachment means, each end of said common shaft being attached to said vacuum housing by a respective one of said second pair of adjustable attachment means, such that the position of all of said plurality of rear wheels can be adjusted in a direction approximately perpendicular to said plane of said suction opening simultaneously.

5. (Original Keep) The underwater vacuum and sterilization system according to claim 1, further comprising a debris trap provided intermediate said vacuum housing outlet and said turbine housing inlet, fluid communication between said vacuum housing outlet and said turbine housing inlet provided via said debris trap.

6. (Original Keep) The underwater vacuum and sterilization system according to claim 1, wherein said turbine is a first turbine, the underwater vacuum further comprising:

a second turbine; and

(Original Keep) a common turbine shaft rotatably supported within said turbine housing, said first turbine and said second turbine being fixed in tandem to said common turbine shaft, whereby water rushing through said first turbine and said second turbine causes rotation of said common turbine shaft.

7. (Original Keep) The underwater vacuum and sterilization system according to claim 6, further comprising a plurality of re-directional baffles provided intermediate said first turbine and said second turbine, said plurality of re-directional baffles straightening water flow from said first turbine before the water flow from said first turbine impinges upon said second turbine.

8. (Original Keep) The underwater vacuum and sterilization system according to claim 1, wherein the vacuum housing has a rear wall, the underwater vacuum further comprising:

a socket attached to said rear wall; and

(Original Keep) a T-shaped handle having a gripping portion and a distal end distal from said gripping portion, said distal end of said T-shaped handle being inserted into said socket.

9. (Original Keep) The underwater vacuum and sterilization system according to claim 1, wherein said suction opening has a perimeter and said perimeter of said suction opening defines a plane, and wherein each of said plurality of wheels is attached to said vacuum housing by adjustable attachment means such that the position of each of said plurality of wheels can be adjusted in a direction approximately perpendicular to said plane of said suction opening.

10. (Original Keep) The underwater vacuum and sterilization system according to claim 1, there further being a variable pressure sterilization chemical and fluid flow mechanism that said fluid flows against said surface with enough pressure to completely clean and sterilize all surfaces under said vacuum housing.

11. (Withdrawn) The underwater vacuum and sterilization system according to claim 1, there further being an interior containment chamber within said vacuum housing, said chamber having more than one flexible member, seal or plurality of bristles or brushes thereby defining a circumferential seal on the bottom edges, that said fluid flow is contained inside said chamber and removed by suction through open top of said chamber, such that said variable pressure fluid flow can flow against said surface with enough pressure to remove all matter and sterilize said surface, such that none of the fluid can escape under said containment chamber and enter the water on the exterior of said vacuum housing.

12. (Withdrawn) The underwater vacuum and sterilization system according to claim 1, there further being adjustable attachment means, said suction opening having a perimeter and said perimeter of said suction opening defining a plane, said containment chamber being attached to interior of said vacuum housing by said adjustable attachment means, such that the position of said containment chamber can be adjusted in a direction approximately perpendicular to said plane of said suction opening.

13. (Withdrawn as redundant) An underwater vacuum and sterilization system comprising:

(Withdrawn as redundant) a vacuum housing having a suction opening at the bottom thereof and a vacuum housing outlet opening, said suction opening being substantially rectangular and having a rear edge, a right edge, a left edge, and a front edge, said suction opening having a
perimeter and said perimeter of said suction opening defining a plane, said vacuum housing having an exterior and an interior, said vacuum housing having a base portion and a cap portion, said cap portion having a rear wall and a front wall spaced apart from said rear wall, said cap portion having a closed top and an open bottom, said open bottom being smaller in area than said suction opening, said cap portion being joined to said base portion at said open bottom of said cap portion, said cap portion having lateral walls that extend between said front and rear wall, said cap portion having a decreasing cross sectional area in sections parallel to said plane of said suction opening, said cross sectional area of said cap portion decreasing from a maximum where said cap portion joins said base portion to a minimum at said closed top of said cap portion;

(Withdrawn as redundant) said base portion having a curved front wall extending from said front edge of said suction opening to said front wall of said cap portion, a rear wall extending perpendicular to said plane of said suction opening from said suction opening rear edge to said rear wall of said cap portion, a right sidewall extending from said curved front wall of said base portion to said rear wall of said base portion and from said right edge of said suction opening to said cap portion, and a left sidewall extending from said curved front wall of said base portion to said rear wall of said base portion and from said left edge of said suction opening to said cap portion, said front and rear walls of said base portion, said left sidewall, said right sidewall, and said cap portion cooperatively forming a concavity which opens to said suction opening;

(Withdrawn as redundant) said vacuum housing outlet opening being formed in said front wall of said cap portion, said vacuum housing outlet opening being as wide as said closed top of said cap portion and extending from said closed top of said cap portion to said curved front wall of said base portion;

(Withdrawn as redundant) a turbine housing fixed to said exterior of said vacuum housing said turbine housing having a turbine housing inlet and a turbine housing outlet, said turbine housing inlet being in fluid communication with said vacuum housing outlet opening;

(Withdrawn as redundant) a turbine rotatably supported within said turbine housing;

(Withdrawn as redundant) an outlet pipe supported by said vacuum housing, said outlet pipe having an outlet pipe inlet and an outlet pipe outlet, said outlet pipe inlet being in fluid communication with said turbine housing outlet;

(Withdrawn as redundant) a brush rotatably supported within said vacuum housing, said brush having a plurality of bristles, said brush being positioned within said vacuum housing such that a predetermined number of said plurality of bristles project beyond said suction opening to the outside of said vacuum housing and contact the surface to be cleaned;

(Withdrawn as redundant) a plurality of front wheels rotatably supported on said exterior of said vacuum housing proximate said front edge of said suction opening;

(Withdrawn as redundant) a plurality of rear wheels rotatably supported by said interior of said vacuum housing intermediate said rear edge of said suction opening and said brush, said front and rear plurality of wheels supporting said suction opening adjacent a surface to be cleaned and allowing the underwater vacuum to be moved about the surface to be cleaned; and

(Withdrawn as redundant) means for transmitting rotational motion from said turbine to said brush;

(Withdrawn as redundant) a variable pressure fluid mechanism fluidly connected to variable pressure pump at water surface for transmitting chemical sterilization chemical and fluid to the interior of the vacuum housing to sterilize and additionally clean surface;

(Withdrawn as redundant) whereby, when said underwater vacuum is supported adjacent a submerged surface to be cleaned by said plurality of wheels and when said outlet pipe outlet is connected to a pump via a hose and the pump is turned on, water being drawn through said vacuum housing will cause rotation of said turbine which in turn causes rotation of said brush to thereby dislodge matter from the submerged surface, the dislodged matter becoming entrained in water being drawn through said vacuum housing, the water and the dislodged matter being removed from proximity of the submerged surface via the outlet pipe.

(Withdrawn as redundant) whereby, when said variable pressure pump is turned on the sterilization chemical and fluid will flow against the submerged surface behind said brush, the said chemical and fluid sterilizing said submerged surface, the water, dislodged matter, sterilization chemical and fluid becoming entrained in water being drawn through said vacuum housing the water and the dislodged matter being removed from proximity of the submerged surface via the outlet pipe

14. (Withdrawn as redundant) The underwater vacuum according to claim 13, further comprising a debris trap provided intermediate said vacuum housing outlet and said turbine housing inlet, fluid communication between said vacuum housing outlet and said turbine housing inlet provided via said debris trap.

15. (Withdrawn as redundant) The underwater vacuum according to claim 13, wherein said turbine is a first turbine, the underwater vacuum further comprising:

(Withdrawn as redundant) a second turbine; and

(Withdrawn as redundant) a common turbine shaft rotatably supported within said turbine housing, said first turbine and said second turbine being fixed in tandem to said common turbine shaft, whereby water rushing through said first turbine and said second turbine causes rotation of said common turbine shaft.

16. (Withdrawn as redundant) The underwater vacuum according to claim 15, further comprising a plurality of re-directional baffles provided intermediate said first turbine and said second turbine, said plurality of re-directional baffles straightening water flow from said first turbine before the water flow from said first turbine impinges upon said second turbine.

17. (Withdrawn as redundant) The underwater vacuum according to claim 13, wherein said vacuum housing has a rear wall formed by said rear wall of said base portion and said rear wall of said cap portion, the underwater vacuum further comprising:

(Withdrawn as redundant) a socket attached to said rear wall of said vacuum housing; and

(Withdrawn as redundant) a T-shaped handle having a gripping portion and a distal end distal from said gripping portion, said distal end of said T-shaped handle being inserted into said socket.

18. (Withdrawn as redundant) The underwater vacuum according to claim 13, there further being adjustable attachment means, each of said plurality of front and rear wheels being attached to said vacuum housing by said adjustable attachment means, such that the position of each of said plurality of front and rear wheels can be adjusted in a direction approximately perpendicular to said plane of said suction opening.

19. (Withdrawn as redundant) The underwater vacuum according to claim 13, wherein:

(Withdrawn as redundant) each of said plurality of front wheels is attached to said vacuum housing by a respective one of a first plurality of adjustable attachment means, such that the position of each of said plurality of front wheels can be adjusted in a direction approximately perpendicular to said plane of said suction opening; and

(Withdrawn as redundant) wherein said plurality of rear wheels are coaxially fixed to a common shaft rotatably supported by said vacuum housing, there further being a second pair of adjustable attachment means, each end of said common shaft being attached to said vacuum housing by a respective one of said second pair of adjustable attachment means, such that the position of all of said plurality of rear wheels can be adjusted in a direction approximately perpendicular to said plane of said suction opening simultaneously.

20. (Withdrawn) A handheld underwater vacuum and sterilization system comprising:

(Withdrawn) a water suction pipe connected to a handheld tubular vacuum head;

(Withdrawn) a variable pressure fluid mechanism fluidly connected to variable pressure pump at water surface for transmitting chemical sterilization chemical and fluid to the interior of the vacuum head, and supported to the interior of said vacuum head, to sterilize and clean the surface;

(Withdrawn) a flexible member, seal or plurality of bristles or brushes thereby defining a circumferential seal on around the inlet edge of the vacuum head;

(Withdrawn) whereby when the handheld vacuum and sterilization system is placed adjacent to a submerged surface the variable pressure fluid flow from the interior of the vacuum head dislodges matter from the surface and sterilizes the surface. The water suction from inside the vacuum head removes all dislodged matter and sterilization chemical immediately from the area being cleaned and sterilized thereby preventing turbidity or sterilization chemical from entering the surrounding water column.

I hope the above properly addresses the restriction issues.

Sincerely,

Mike McGraw
Cell: (281) 652-6313

18. (Original) The underwater vacuum according to claim 15, further having adjustable attachment means, each of said plurality of transducer units being attached to said vacuum housing by said adjustable attachment means, such that the position of each of said plurality of transducer units can be adjusted in a direction approximately perpendicular to said plane of said suction opening.

19. (Original) The underwater vacuum according to claim 18, wherein:

each of said plurality of transducer units is attached to said vacuum housing by a respective one of a first plurality of adjustable attachment means, such that the position of each of said plurality of transducer units can be adjusted in a direction approximately perpendicular to said plane of said suction opening; and

wherein said plurality of transducer units are movably fixed to a respective one of a second pair of adjustable attachment means, each of said plurality of transducer units being attached to said vacuum housing by a respective one of said second pair of adjustable attachment means, such that the position of all of said plurality of transducer units can be adjusted in a direction approximately perpendicular to said plane of said suction opening simultaneously.

20. (Original) A handheld underwater vacuum and ventilation system comprising:

a water suction pipe connected to a handheld vacuum head;

a variable pressure fluid mechanism fluidly connected to variable pressure ports of water suction pipe comprising elongated conduit means connected and fluid to the interior of the vacuum head, and connected to the interior of said vacuum head, to suction and clean the surface;

a flexible connector, and or plurality of bristles or brushes thereby defining a circumferential seal on ground for fluid edge of the vacuum head;

wherein when the handheld vacuum and ventilation system is placed adjacent to a submerged surface the variable pressure fluid flow from the interior of the vacuum head discharges under from the surface and ventilates the surface. The water suction pipe, below the vacuum head underneath discharged under and ventilation simultaneously from the area being cleaned and ventilated thereby preventing turbidity or ventilation stirred from entering the surrounding water column.

I hope the above properly addresses the restriction issues

Sincerely,

Mike McGraw
Cell: (281) 652-6313